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Deodorization Filter Agent
(Tuo e chou de lu qing ji)

Haoshi Guangheng, et. al.

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INVENTORS	(72): GUANGCHENG, HAOSHI; WANG JIAHONG, YAN; XU, ZHANG WEI
APPLICANT	(71): TIANJIN SANLING ENVIRONMENTAL PROTECTION TECHNICAL INSTITUTE CO., LTD.
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CLAIMS

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1. This is a deodorization filter agent. Its special characteristic is: it is a composite of ascorbic acid and ferrous compound within which the ferrous compound is ferrous sulfate, ferrous chloride or ferrous nitrate.

2. This is a deodorization filter agent. Its special characteristic is: it is formed by an active carbon carrier impregnated with an aqueous solution of the composite of ascorbic acid and ferrous compound within which the ferrous compound is ferrous sulfate, ferrous chloride or ferrous nitrate.

3. This is a deodorization filter agent. Its special characteristic is: it is formed by a paper or cloth carrier impregnated with an aqueous solution of the composite of ascorbic acid and ferrous compound within which the ferrous compound is ferrous sulfate, ferrous chloride or ferrous nitrate.

4. The special characteristic of the deodorization filter agent mentioned in Claim 1 is: the weight ratio of the ferrous ions and ascorbic acid in the said ferrous compound is 1:0.02-0.3.

5. The special characteristic of the deodorization filter agent mentioned in Claims 2 or 3 is: the concentration weight ratio of the aqueous solution of the said ascorbic acid and ferrous compound is 0.1-30%.

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*Numbers in the margin indicate pagination in the foreign text.

SPECIFICATIONS /1

Deodorization Filter Agent

This invention involves a type of filter agent, and especially a filter agent that eliminates foul smells from the living environment such as ammonia, hydrogen sulfide, and thiols.

At present, the structures of equipment for processing malodorous gases are complicated, they are large in volume, operations are also troublesome, and they are not suitable for use in homes or public environments. The perfume covering method, active carbon adsorption method, acid-base neutralizing method using a reaction of malodorous substances and acid or base, and the method of a chemical reaction of the main components of malodorous substances and citric acid (2-hydroxypropane-1,2,3-tricarboxylic acid) and maleic acid are mainly employed for general public environments such as toilets and garbage cans so as to eliminate foul odors. However, the drawbacks of all of these vary in degree. For example, the perfume covering method is only added into other gases and mixed with the foul smell and is basically unable to eradicate it; the acid-base neutralizing method is only able to eliminate the malodorous components by reacting with an acid or base; further, the citric acid and maleic acid chemical methods are only somewhat effective against the ammonia and amine in the malodorous components and it is basically ineffective against thiols; moreover, the acid-base neutralizing method as well as the citric acid and maleic acid

chemical methods are not easily preserved (the storage time is lengthened and the decrease of deodorization effects is accelerated), and at the same time they are also harmful to the human body.

In view of this, the aim of this invention is to provide a type of deodorization filter agent that has the effect of eliminating various types of odorous substances, possesses stable deodorization effects, and at the same time can directly come into contact with the safe substances in foods.

The aim of this invention is realized as follows: it is a composite of ascorbic acid and ferrous compound within which the ferrous compound is ferrous sulfate, ferrous chloride or ferrous nitrate.

It is formed by an active carbon carrier impregnated with an aqueous solution of the composite of ascorbic acid and ferrous compound within which the ferrous compound is ferrous sulfate, ferrous chloride or ferrous nitrate.

It is formed by a paper or cloth carrier impregnated with an aqueous solution of the composite of ascorbic acid and ferrous compound within which the ferrous compound is ferrous sulfate, ferrous chloride or ferrous nitrate.

The weight ratio of the ferrous ions and ascorbic acid in the said ferrous compound is 1:0.02-0.3.

The concentration weight ratio of the aqueous solution of the said ascorbic acid and ferrous compound is 0.1-30%.

The filter agent of this invention has a small quantity of ascorbic acid, which can even more so maintain the active state of the ferrous ions, it can form a chelate with ammonia, and form Fe-S with sulfur-containing foul smells. Therefore, it has very high elimination efficiency of the foul smells of hydrogen sulfide and thiols.

The ratio of the ferrous ions and ascorbic acid in the ferrous compound of the filter agent of this invention is 1:0.02-0.3 (weight ratio), and the range of the relatively ideal effects is 1:0.03-0.1 (weight ratio). If the amount of ascorbic acid used exceeds the upper limit, the compound then easily manifests a purplish color, and if the amount of ascorbic acid used is lower than the lower limit of the range, the deodorization effects will not be fully brought into play and the stability of the ferrous ions will be poor. The concentration of the aqueous solution of the filter agent can differ according to its application and usage environment. Generally, the concentration of the ascorbic acid and ferrous compound is 0.1-30% (based on the weight ratio), and it is generally better for it to be 1.0-20%.

Generally, if the amount of filter agent aqueous solution in the /2
above-mentioned concentration range using 100 grams of active carbon carrier (powder or granular active carbon, zeolite and bentonite can also be used instead) and a weight of 10-20% is excessively small, then the anticipated deodorization effects will not be able to be attained, and if the amount of filter agent is excessively large,

then the carrier will not be able to be fully absorbed and this will result in waste.

Generally, when this type of paper or cloth containing ascorbic acid and ferrous compound and formed from paper or cloth carrier impregnated with 0.5-20% filter agent aqueous solution is placed aside for a long time, it easily changes color, and this changing of color can be prevented by adding in a suitable amount of thiosulfate (for example: sodium thiosulfate) or dithionate (for example: sodium dithionate).

The properties of the filter agent aqueous solution and carriers (active carbon, paper or cloth) of this invention are stable, it can be stored in air for a long time, and it is also able to deodorize in damp environments. It can especially come into contact food without worrying people. For example, the use of paper or cloth impregnated with the filter agent solution prevents foul smells in the cold storage of meat, fish and other foods.

The following preferred embodiments serve to explain this invention in detail.

[Preferred Embodiment 1]

0.5g of ascorbic acid were added into 100mL of aqueous solution made from 27.5g of ferrous sulfate (the molecular weight was 278.03) containing 7 water molecules, and it was dissolved to prepare an iron ascorbate aqueous solution.

The above-mentioned iron ascorbate aqueous solution was diluted with water 10 fold and concocted into a liquid filter agent.

We then took two 100ml gas-washing bottles and placed 10g of chicken manure in each, water was added in one bottle and 50mL of the above-mentioned prepared filter agent was added in the other bottle, and then we placed at a constant room temperature of 37°C for 24 hours. Afterwards, we separately passed in 20L of pure air into the two gas-washing bottles to blow out the gas in the bottles, and used an air bag to collect the hydrogen sulfide, thiols and ammonia in the mixed gas (the deodorized gas and gas not yet managed), and separately made determinations. The results are shown in Table 1.

[Preferred Embodiment 2]

We used 15% (weight ratio) of the original iron ascorbate aqueous solution concocted in Preferred Embodiment 1 with granular active carbon (20% weight ratio of powdery active carbon sold on the market as well as 20% zeolite, 60% bentonite, mixed and pressed to shape, then dried and used a common method to make grains with grain size of 1.5-2.5mm), immersed for 24 hours at ordinary temperature, and after drying made it into granular filter agent.

We then took one 100ml gas-washing bottle, put in 20g of chicken manure, added in 100ml of distilled water, and then we placed it at a constant room temperature of 37°C for 24 hours. Afterwards, we separately passed in 20L of pure air to blow out the gas in the bottle, and used an air bag for collection. Afterwards, we took out

20g of the aforementioned granular filter agent and filled it into a glass tube, and the 20L of gas collected in the air bag was passed through at a rate of 2-3L/min. We measured the gas in the air bag. The measurement results are shown in Table 1.

The results in Table 1 show that the liquid and granular filter agent of this invention have very great elimination effects on hydrogen sulfide, methylthiol, ammonia, and other foul smells.

Table 1 /3

	Malodorous Component	Concentration of Malodorous Component (ppm)		Deodorization Rate (%)
		No processing	After processing	
Preferred Embodiment 1	Hydrogen sulfide			
	Methylthiol			
	Ammonia			
Preferred Embodiment 2	Hydrogen sulfide			
	Methylthiol			
	Ammonia			

(Notes): The measurement method for the malodorous components was:

(1) Hydrogen sulfide and methylthiol: quantitatively measured using gas chromatography;

(2) Ammonia: after the ammonia absorption liquid (1/50N-H_2SO_4) was collected, it was quantitatively measured using absorption photometry.

[Preferred Embodiment 3]

We diluted the original iron ascorbate aqueous solution concocted in Preferred Embodiment 1 (3 months after being made) two fold with water, sprayed a fixed amount on paper (Toyo filter paper No. 5C), after drying the absorbed amounts of iron ascorbate were (A)

0.38g; (B) 0.39g; (C) 0.37g; (D) 0.48g, and then the deodorization paper was made.

25% ammonia water was used for 4 fold dilution to make the ammonia water test solution. We took 5 pieces of filter paper and separately immersed them in 1ml test solutions, individually placed the filter papers in 5 polyethylene 500ml bottles, then separately placed the four above-mentioned types of deodorization papers (A)-(D) in 5 containers, and sealed for a certain length of time. The resulting changes of the foul odor are shown in Table 2.

Table 2

Test No.	Filter Agent (Paper)	Foul Odor		
		After 1 Hour	After 3 Hours	After 24 Hours
1	A+B	No stench	No stench	No stench
2	C	Very little stench	No stench	No stench
3	½ D	No stench	No stench	No stench
4	¼ D	Strong stench	Strong stench	Strong stench (weaker)
5	None	Strong stench	Strong stench	Strong stench